

Original Research Article

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Diversity of climbers in Vallanadu Black-buck Sanctuary, Tuticorin, Tamil Nadu

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Article Info

Abstract

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In climbers the stems are weak and these plants need various climbing devices in order to support growth and development. The climbers are predominately angiosperms. The present study chiefly focuses on diversity of climbers in Vallanadu Black-buck Sanctuary. The present study recorded 28 herbaceous climbers and 14 lianas from the scrub forest of Vallanadu Black-buck sanctuary. In dicotyledons, 15 families containing 33 genera and 40 species were recorded. In monocotyledons, 2 families containing 1 genus and 1 species each were recorded. The present study reported invasive species such as *Ipomoea obscura*, *Ipomoea pes-tigridis*, *Clitoria ternatea* and *Passiflora foetida*. The present study recorded 24 medicinal climbers. Conservation of climber and lianas is the need of the hour and climbers provide valuable germplasm as medicinal plants for the benefit of humankind.

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Introduction

Vallanadu Black-buck Sanctuary is located in Tuticorin District, Tamil Nadu. The forest type of this sanctuary is a tropical scrub and the plants of this region are adapted to the arid condition. This type of biome consists of low-lying, dense thorny underbrush with extensive root system. This area receives less rainfall, continuous long summer, plenty of dry winds, poor drainage and medium to poor soil quality. The plants and animals of the tropical scrub forest have adapted to flourish in this harsh environment. The scrub forests are the source of fodder for domestic and range animals also are the source of wood products, water and wildlife (Miller, 1997). In Vallanadu Black-buck Sanctuary forest very

few studies have been conducted to highlight the vegetation structure and composition. This study in Vallanadu Scrub Forest was an attempt to document the diversity of climbers in the study area.

Area of study

The area of study is a protected area Vallanadu Black-buck sanctuary (*Antelope cervicapra*) located in the Tuticorin revenue district of south Tamil Nadu. It is an isolated hillocks and ranges between parallels of latitude 8°40' and 8°44' and between meridian of latitudes 77°54' and 77°57' within the tropical region. The region is adjacent to the Vallanadu village of Srivaikundam Taluk with scrub forest. It can be reached at a distance

of 12 km east of Palayamkottai and 35 km west of Tuticorin, along national highway 7A. The forest area spread over 2058.83 hectares and the total area of forest boundary is about 30 km. Topographically, Vallanadu forest is divided into three forest reaches and the formation of hills is grouped under two blocks viz., Block A and Block B. Block A is situated on the northern crest comprising a single compartment. Block B comprises the 4 compartments. The National highway No. 7A from Tirunelveli to Tuticorin is transverse between Block A and Block – B. The Vallanadu hills are raised to an elevation of 210 m above MSL. The trigonometrical point of the highest peak in the study area is 218 m. There are many seasonal streams cutting deep ravine all along the hills.

Materials and methods

The present research was done by extensive survey and field observation of plant species from the study area from April 2006 to March 2008. Field trips (39) were undertaken during field work. The processed plant specimens are kept in The Rapinat Herbarium, Tiruchirapalli (RHT) and the herbarium of survey of Medicinal plants unit, Central council for research in Siddha (CCRS), Palayamkottai, Tirunelveli. The collected specimens were identified with the standard taxonomic literature such as Flora of Presidency of Madras (Gamble and Fischer, 1956) Flora of Tamil Nadu Carnatic (Matthew, 1983 – 1988). All the specimens were identified correctly and described. The specimens were processed for the preparation of Herbarium by standard methods (Santapau, 1973). The field number of the specimens examined with the code XCH, St. Xavier's College, Herbarium. For collect information about the medical uses standard references (Daniel and Umamaheshwari, 2001 and Yoganarasiman, 2000) were referred.

Results

The present study recorded 28 herbaceous climbers and 14 lianas from all the forests types of Vallanadu Black-buck sanctuary, covering 17 families. In dicotyledons, there are 15 families containing 33 genera and 40 species. In monocotyledons, there are 2 families containing 1 genus and 1 species each (Table 1). Considering all climbers (C) and lianas (L), 26 species are stem twiners, 3 are spiny climbers, 2 are hooked climbers, 8 species are tendril climbers and 3 species are stragglers.

The present study recorded five climber geophytes, of which *Asparagus racemosus*, *Coccinea indica*, *Corallocarpus epigaeus*, *Gloriosa superba* are with tuberous roots and *Cissampelos pareira* is rhizomatous. Some of the selected climbers are depicted in Fig. 1.

Endemics

Asparagus racemosus is reported as a threatened species in Southern Western Ghats (Sarvalingam et al., 2012; Uma and Parthipan, 2015). *Gloriosa superba* identified as an endangered species in Western Ghats (Amalraj et al., 1991; Sukumaran and Raj, 2007; Gritto et al., 2012). The medicinal climber *Hemidesmus indicus* reported as a depleted species in Western Ghats (Amalraj et al., 1991; Matthew, 1981-1988; Sukumaran and Raj, 2007). *Ceropegia juncea* is a peninsular endemic plant recorded in the present study (Daniel and Umamaheshwari, 2001). According to IUCN conservation status 38 plants were categorized under “Not Evaluated” and 3 species (*Rhynchosia minima*, *Gloriosa superba* and *Desmodium triflorum*) included in “Least Concern” and one species (*Abrus fruticulosus*) included under “Data Deficient”.

Exotics

The ENVIS database on floral diversity of Tamil Nadu (<http://tnenvis.nic.in/>) reports a total of 1226 taxa as introduced. This accounts for 22% of the total flora of Tamil Nadu. About 79% of the alien flora of Tamil Nadu exists only under cultivation; 200 alien species occur as naturalized weeds and another 56 species are found both in cultivation as well as escapes which are naturalized. The present study reported invasive species such as *Ipomoea obscura*, *Ipomoea pes-tigridis*, *Clitoria ternatea* and *Passiflora foetida*.

Distribution of climbers at Vallanadu Black-buck sanctuary

Capparis sepiaria, *Abrus fruticulosus* and *Asparagus racemosus* are large shrubs found common mixed with *Euphorbia antiquarum* and *Euphorbia tortilis* especially on the northern and eastern foot hill. *Cissampelos pareira*, *Cissus quadrangularis* and *Abrus precatorius* are common in foot hill region as an extensive climber forming a thicket, *Cocculus hirsutus* and *Canavalia virosa* are straggling over bushes and small trees. They are common in slopes. *Grewia flavescens* is common in the north-west foot hill region.

Table 1. List of climbers in Black-buck sanctuary, Vallanadu, Tamil Nadu.

S. No.	Botanical name	Common name	Family	Nature of climbing organ (Modification)	Model of climbing	Flowering and fruiting
1.	<i>Abrus fruticulosus</i> Wight & Arn.	-	Fabaceae	Main stem and branches	Twiner	Nov. – Mar.
2.	<i>Abrus precatorius</i> L. ssp. <i>precatorius</i>	Indian Liquorice	Fabaceae	Main stem and branches	Twiner	Jan. – Mar.
3.	<i>Asparagus racemosus</i> Willd.		Asparagaceae	Main stem and branches	Spiny climber	Jan. – Apr.
4.	<i>Canavalia virosa</i> (Roxb.) Wight & Arn.	Wild Sword Bean	Fabaceae	Main stem and branches	Twiner	Oct. – Feb.
5.	<i>Capparis sepiaria</i> L.	Wild caper bush	Capparaceae	Hooked thorns	Straggler	Dec. – Apr.
6.	<i>Capparis zeylanica</i> L.	Ceylon caper	Capparaceae	Stipular spines	Straggler	Jan. – Apr.
7.	<i>Cardiospermum halicacabum</i> L.	Balloon -vine	Sapindaceae	Petiole modified	Tendrill climber	Oct. – Mar.
8.	<i>Ceropegia juncea</i> Roxb.	-	Apocynaceae	Main stem and branches	Twiner	Sep. – Jan.
9.	<i>Cissampelos pareira</i> L.	Velvet leaf pareire	Menispermaceae	Main stem and branches	Twiner	Feb. – Apr.
10.	<i>Cissus quadrangularis</i> L.	Adament climber	Vitaceae	Axillary tips	Tendrill climber	Nav. – Jan.
11.	<i>Cissus vitiginea</i> L.	-	Vitaceae	Axillary tips	Tendrill climber	Aug. – Dec.
12.	<i>Clitoria ternatea</i> L.	Butterfly pea	Fabaceae	Main stem and branches	Twiner	Jan. – Jun.
13.	<i>Coccinia grandis</i> L. Voigt.	Ivy gourd	Cucurbitaceae	Stipules modified	Tendrill climber	Nov. – Mar.
14.	<i>Cocculus hirsutus</i> (L.) Diels	Broom creeper	Menispermaceae	Main stem and branches	Twiner	Jan. – Dec.
15.	<i>Corallocarpus epigaeus</i> (Roettl.) Hook. f.	-	Cucurbitaceae	Stipules modified	Tendrill climber	Nov. – Mar.
16.	<i>Ctenolepis garcini</i> (L.) C.B.Clarke	-	Cucurbitaceae	Stipules modified	Tendrill climber	Nov. – Jan.
17.	<i>Cyphostemma setosum</i> (Roxb.) Alston	-	Vitaceae	Axillary tips	Tendrill climber	Oct. – Mar.
18.	<i>Desmodium triflorum</i> (L.) DC.	Three flowered trickle foil	Fabaceae	main stem and branches	Twiner	Nov. – Feb.
19.	<i>Gloriosa superba</i> L.	Malabar Glory lily	Colchicaceae	Leaf	Leaf climber	Oct. – Dec.
20.	<i>Grewia flavescens</i> Juss.	-	Malvaceae	Stem	Straggler	Oct. – Feb.
21.	<i>Grewia umbellifera</i> Bedd.	Ghat gooseberry	Malvaceae	Stem	Straggler	Jan. – Dec.
22.	<i>Hemidesmus indicus</i> (L.) R. Br. ex Schult. var. <i>indicus</i>	-	Apocynaceae	main stem and branches	Twiner	Oct. – Jan.

Table 1. Cntd...

S. No.	Botanical name	Common name	Family	Nature of climbing organ (Modification)	Model of climbing	Flowering and fruiting
23.	<i>Hemidesmus indicus</i> var. pubescens (Wight & Arn.) Hook. f.	-	Apocynaceae	Main stem and branches	Twiner	Aug. – Dec.
24.	<i>Hugonia mystax</i> L.	Climbing flax	Linaceae	Peduncle	Hook climber	Jan. – Dec.
25.	<i>Ichnocarpus frutescens</i> (L.) W.T.Aiton.	Black creeper	Apocynaceae	Main stem and branches	Twiner	Oct. – Jan. Jun. - Aug.
26.	<i>Ipomoea marginata</i> (Desr.) Verdc.	-	Convolvulaceae	Main stem and branches	Twiner	Nov. – Jan.
27.	<i>Ipomoea obscura</i> (L.) Ker Gawl.	Lesser Glory	Convolvulaceae	Main stem and branches	Twiner	Jan. – Dec.
28.	<i>Ipomoea pes-tigridis</i> L.	Tiger's foot creeper	Convolvulaceae	Main stem and branches	Twiner	Jan. – Dec.
29.	<i>Jasminum angustifolium</i> (L.) Willd.	Wild Jasmine	Oleaceae	Main stem and branches	Twiner	Jun. – Aug.
30.	<i>Macrotyloma uniflorum</i> (Lam.) Verdc.	Horse gram	Fabaceae	Main stem and branches	Twiner	Feb. – May
31.	<i>Merremia tridentata</i> (L.) Hall. fil.	-	Convolvulaceae	Main stem and branches	Twiner	Jan. – Mar.
32.	<i>Mukia maderaspatana</i> (L.) M.Roem.	Madras pea pumpkin	Cucurbitaceae	Stipule	Tendrill climber	Oct. – Feb.
33.	<i>Passiflora foetida</i> L.	Passion flower	Passifloraceae	Main stem and branches	Twiner	Oct. – Mar.
34.	<i>Pentatropis capensis</i> (L. f.) Bullock	Salt killer vine	Apocynaceae	Main stem and branches	Twiner	Jan. – Dec., Jun. – Aug.
35.	<i>Pergularia daemia</i> (Forsk.) Chiov.	Trellis vine	Apocynaceae	Main stem and branches	Twiner	Aug. – Feb.
36.	<i>Reissantia indica</i> (Willd.) N.Hallé.	-	Celastraceae	Main stem and branches	Twiner	Feb. - May
37.	<i>Rhynchosia minima</i> (L.) DC. LC	-	Fabaceae	Main stem and branches	Twiner	Dec. – Feb.
38.	<i>Rivea hypocrateriformis</i> (Desr.) Choisy	Midnapore creeper	Convolvulaceae	Main stem and branches	Twiner	Nov. – Feb.
39.	<i>Sarcostemma acidum</i> (Roxb.) Voigt.	Moon creeper	Apocynaceae	Main stem and branches	Twiner	Jan. – Apr.
40.	<i>Solanum trilobatum</i> L.	Climbing brinjal	Solanaceae	Stem	Spiny climber	Nov. - Mar.
41.	<i>Tinospora cordifolia</i> (Willd.) Mers.	Heart leaf moon seed	Menispermaceae	Main stem and branches	Twiner	May – Aug.
42.	<i>Ziziphus nummularia</i> (Burm.f.) Wight & Arn.	Wild jujube	Rhamnaceae	Armed stem	Straggler	Apr. – Aug.

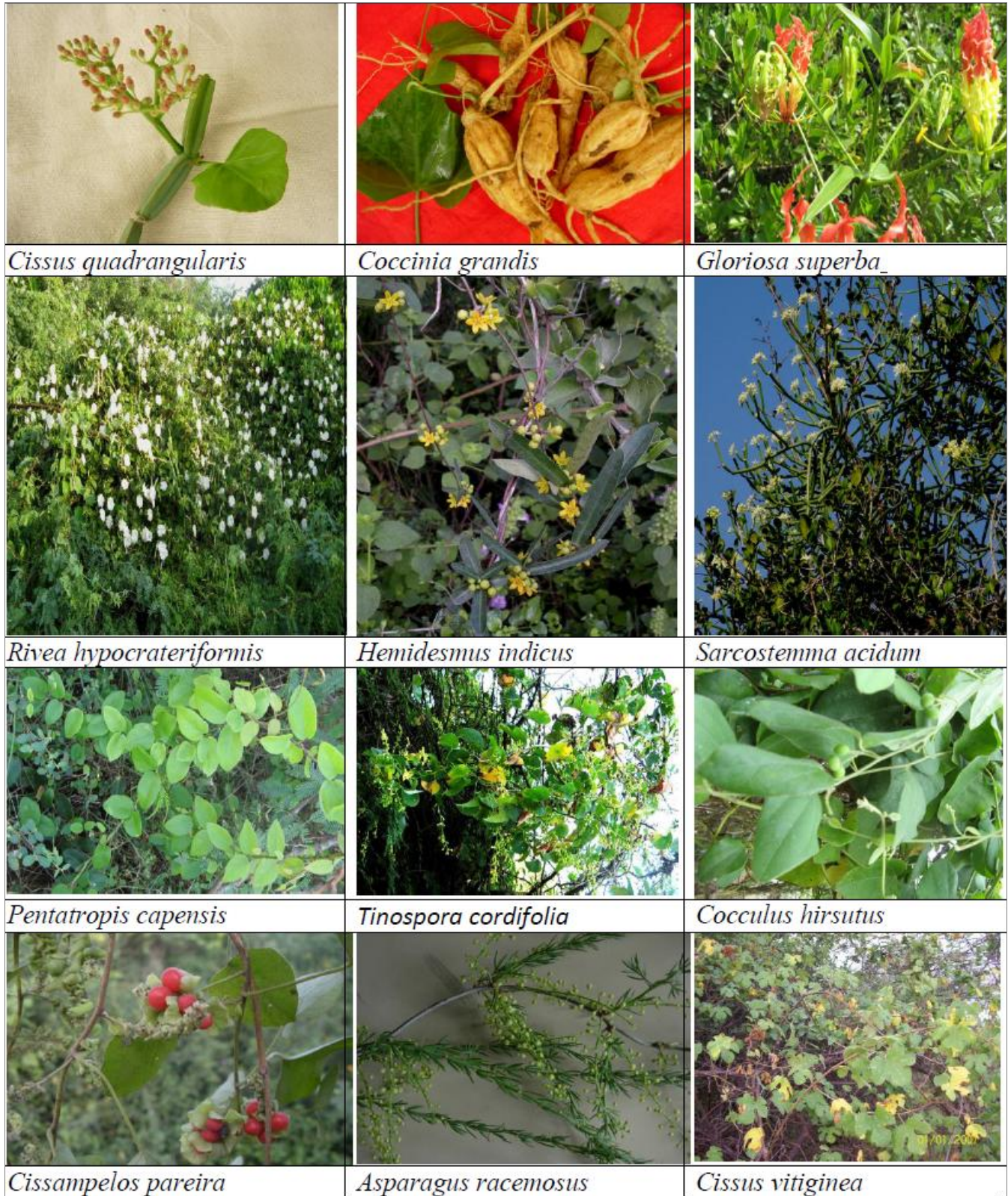


Fig. 1: Selected climbers in the study site.

Reissantia indica, *Hugonia mystax*, *Coccinia grandis*, *Mukia maderaspatana*, *Hemidesmus indicus*, *Pergularia daemia*, *Ipomoea obscura* and *Rivea hypocrateriformis* are common throughout the forest. *Ziziphus nummularia*, *Gloriosa superba*, *Cardiospermum halicacabum* and *Passiflora foetida* are found along with road sides and waysides. *Cissus vitiginea* is rare and found at the top and upper slope of the hill. *Clitoria ternatea*, *Rhynchosia minima*, *Ichnocarpus frutescens* and *Solanum trilobatum* are less common in the forest. *Ctenolepis garcini* are forming a mat on bushes and thickets. *Cyphostemma setosum* and *Desmodium triflorum* are a found on thickets and bushes in moist shady places. *Sarcostemma acidum* is hanging from *Euphorbia* and *Dalbergia* in foot hills.

Economical importance

Canavalia virosa fruits are used as vegetable. *Ipomoea obscura* and *Ipomoea marginata* young leaves used as spinach. *Reissantia indica* is considered to be good fodder for goats and local villagers believed that it increases their fat content. So it is widely disturbed by local people and grazing goats. It is also a favourite fodder for native Black-bucks. The present study recorded 24 medicinal climbers (Table 2).

Discussion

Similar to present study, previous reports on climber diversity at Southern Western Ghats of Coimbatore (Sarvalingam and Rajendran, 2015), in Rajshahi region, Bangladesh (Rony Rani et al., 2019), North-Eastern Uttar Pradesh, India (Dvivedi et al., 2016), in Koch Bihar District of West Bengal, India (Bandopadhyaya and Mukherjee, 2010), in Northern Telangana (Suthari et al., 2014), in Point Calimere Wildlife and Bird Sanctuary Padma Sorna Subramanian et al. (2020) and in Monghyr district (Bihar). (Singh, 1990) also recorded taxonomic and ecological diversity of climbing plants. Muthumperumal and Parthasarathy (2010), Reddy and Parthasarathy (2003), Mascaro et al. (2004), Appanah et al. (1999), Perez-Salicrup et al. (2001), Parthasarathy et al. (2004), Nabe-Nielsen et al. (2001) reported on the lianas diversity in various forests.

The fragmented area of forest is dominated by lianas. The large lianas suppress the tree growth and reduce tree biomass (Laurance, 2001). The increase in lianas changes the structural and functional composition of

forests. The lianas over 10 cm in diameter, measured at a height of 1.5 to 2.5 metres. Lianas support greater biomass and productivity than trees of equal diameter (Schnitzer and Bongers, 2002; Gerwing and Lopes Farias, 2000). The commonest liana species in the studied forest include *Jasminum angustifolium* and *Coccinia grandis*. The most infested host species are *Acacia* and *Dalbergia*.

Rhynchosia minima, *Mukia maderaspatana*, *Macrotyloma uniflorum*, *Ipomoea obscura* and *Desmodium triflorum* are common climbers during rainy seasons. The flowering phenology of climbers in the study area depends on the duration and intensity of light as well as temperature. The climatic conditions such as temperature (Ashton et al., 1988), rainfall (Dutta and Devi, 2015; Mouplea et al., 2014; Opler et al., 1976) and water stress (Borchert, 1983) influence the flowering. *Reissantia indica*, *Cissampelos pareira*, *Capparis zeylanica* and *Asparagus racemosus* starts flowering and fruiting during sunniest months of the year, so the seed maturation occur during the south west monsoon.

Hemidesmus indicus, *Jasminum angustifolium*, *Ziziphus nummularia* and *Tinospora cordifolia* starts flowers during long summer with occasional rains. This heavy rain stimulates flowering and followed by fruiting. The maturation of fruit and dispersal of seeds occur with the onset of North West monsoon. The species such as *Ceropegia juncea*, *Cissus quadrangularis*, *Coccinia grandis*, *Ctenolepis garcini*, *Desmodium triflorum*, *Gloriosa superba* and *Rivea hypocrateriformis* starts flowering during the middle of the rainy season and shed the seeds during at the end of the rainy season. In *Grewia flavescens* and *Grewia umbellifera* fruiting peak occur during post monsoon season. *Pentatropis capensis* and *Ichnocarpus frutescens* exhibits two peaks of flowering in a year. Environmental cues exactly control the seasonal flowering (Frankie et al., 1974; Reich and Borchert, 1984; Borchert, 1994; Lobo et al., 2003).

Conclusions

The diversity and role of climbers depends upon the climate and environmental factors. Climbing plants account for significant portion in the tropical scrub forests. The lianas are nesting site for many birds in the study area and it provide important role in forest regeneration as they keep many pollinators for flowering plants.

Conflict of interest statement

Authors declare that they have no conflict of interest.

References

- Amalraj, V.A., Velayudhan, K.C., Abraham, Z., 1991. Threatened medicinal plants in Western Ghats. In: Karunakaran, C.K. (Ed), Proc. of the Symposium on Rare, Endangered and Endemic Plants of Western Ghats, pp.215-220.
- Appanah, S., Gentry, A.H., LaFrankie, J.V., 1999. Liana diversity and species richness of Malaysian Rain Forests. *J. Trop. For. Sci.*, 6(2): 116 -123.
- Ashton, P. S., Givnish, J.P., Appanah, S., 1988. Staggered flowering in the Dipterocarpaceae: New insights into floral induction and evolution of mast fruiting in the seasonal tropics. *Amer. Naturalist*, 132: 44-66.
- Bandopadhyaya, S., Mukherjee, S. K., 2010. Diversity of climbing plants in Koch Bihar district of West Bengal, India. *Pleione*, 4(1): 82-89.
- Borchert, R., 1983. Phenology and control of flowering in tropical trees. *Biotropica*, 15: 81-89.
- Borchert, R., 1994. Soil and stem water storage determine phenology and distribution of tropical dry forest trees. *Ecology*, 75: 1437-1449.
- Daniel, P., Umamaheswari, P., 2001. The Flora of the Gulf of Mannar, Southern India. Botanical Survey of India, Coimbatore.
- Dutta, G., Devi, A., 2015. Phenology and population structure of six tree species in tropical forest of Assam, Northeast India. *Trop. Ecol.*, 56: 343-399.
- Dvivedi, A., Srivastava, S., Shukla, R. P., 2016. Climber diversity across vegetational landscape of North-Eastern Uttar Pradesh, India. *Not. Sci. Biol.*, 8(4): 489-497.
- Frankie, G., Baker, W.H.G., Opler, P.A., 1974. Comparative phenological studies of trees in tropical wet and dry forests in the lowlands of Costa Rica. *J. Ecol.*, 62: 881- 913.
- Gamble, J.S., Fischer, C.F.S., 1956. Flora of the Presidency of Madras, London.
- Gerwing, J.J., Lopes Farias, D., 2000. Integrating liana abundance and forest stature into an estimate of total aboveground biomass for an eastern Amazonian forest. *J. Trop. Ecol.*, 16: 327-335.
- Gritto, M.J., Aslam, A., Nandagopalan, V., 2012. Ethnomedicinal survey of threatened plants in Pachamalai hills, Tiruchirapalli district, Tamilnadu, India. *Int. J. Res. Ayur. Pharm.*, 3(6): 844-846.
- Laurance, W.F., 2001. Rain forest fragmentation and the structure of Amazonian liana communities. *Ecology*, 82: 105-116.
- Lobo, J.A., Quesada, M., Stoner, K.E., Fuchs, E.J., Herrerías-Diego, Y., Rojas, J., Saborío, G., 2003. Factors affecting phenological patterns of bombacaceous trees in seasonal forests in Costa Rica and Mexico. *Amer. J. Bot.*, 90: 1054-1063.
- Mascaro, J.S., Schnitzer, S.A., Carson, W.P., 2004. Liana diversity, abundance and mortality in a tropical wet forest in Cost Rica. *Forest Ecol. Manage.*, 190: 3-14.
- Matthew, K.M., 1981-1988. Flora of Tamil Nadu Carnatic. The Raphinat Herbarium, Tiruchirapalli, India.
- Miller, D., 1997. Rangelands and Range Management. Newsletter, ICIMOD, 27.
- Moupela, C., Doucet, J.L., Kasso, D., Yves, B., Adeline, F., Cedric, V., 2014. Reproductive ecology of a volnable non-timber forest product. *Trop. Ecol.*, 55: 327-338.
- Muthumperumal, C., Parthasarathy, N., 2010. A large-scale inventory of liana diversity in tropical forests of south Eastern Ghats, India. *Syst. Biodivers.*, 8(2): 289-300.
- Nabe-Nielsen, J., 2001. Diversity and distribution of lianas in a neotropical rain forest, Yasuna National Park, Ecuador. *J. Trop. Ecol.*, 17: 1-19.
- Opler, A., Frankie, G., Baker, H., 1976. Rainfall as a factor in the release, timing, and synchronization of anthesis of tropical trees and shrubs. *J. Biogeogr.*, 3: 231-236.
- Padma Sorna Subramanian, M., Saravana Ganthi, A., Subramonian, K., 2020. Diversity of Angiosperm climber species in Point Calimere Wildlife and Bird Sanctuary, Tamil Nadu. *Int. J. Adv. Res.*, 8(11): 1146-1155.
- Parthasarathy, N., Muthuramkumar, S., Sridhar Reddy, M., 2004. Patterns of liana diversity in tropical evergreen forests of peninsular India. *Forest Ecol. Manage.*, 190: 15-31.
- Perez-Salicrup, D.R., Sork, V.L., Putz, F.E., 2001. Lianas and trees in a liana forest of Amazonian Bolivia. *Biotropica*, 33: 34-47.
- Reddy, M.S., Parthasarathy, N., 2003. Liana diversity and distribution in four tropical dry evergreen forests on the Coromandel coast of south India. *Biodivers. Conserv.*, 12: 1609-1627.
- Reich, P.B., Borchert, R., 1984. Water stress and tree phenology in a tropical dry forest in the lowlands of Costa Rica. *J. Ecol.*, 72: 61 - 74.

- Rony Rani, A.K.M., Rafiul Islam, Mahbubur Rahman, A.H.M., 2002. Diversity of Angiosperm climber species in Rajshahi Region, Bangladesh *Int. J. Adv. Res.*, 7(11): 522-536.
- Santapau, H., 1973. A Dictionary of the flowering plants in India. Council of Scientific & Industrial Research, New Delhi.
- Sarvalingam, A., Rajendran, A., 2015. A. Diversity of climber in the Southern Western Ghats of Coimbatore district Tamil Nadu, India National Conference on Conservation of Aquatic and Terrestrial Biodiversity (NCAT 2015) St. John's College, Palayamkottai -627 002, Tamilnadu, India, Jan. 22 – 25: p. 45 -47.
- Sarvalingam, A., Rajendran, A., Sivalingam, R., 2012. Documentary of woody flora and its usage in Maruthamalai Hills of the Southern Western Ghats of Coimbatore district, India. *Res. Plant Biol.*, 2(1): 7-14.
- Schnitzer, S.A., Bongers, F., 2002. The ecology of lianas and their role in forests. *Trends Ecol. Evol.*, 17: 223–230.
- Singh, K.L.B., 1990. Twiners and Climbers of Monghyr district (Bihar). *Higher Plants of Indian Subcontinents*, pp.183-200.
- Sukumaran, S., Raj, A.D.S., 2007. Rare endemic threatened (RET) trees and lianas in the sacred groves of Kanyakumari District. *Indian For.*, 133: 1254–1266.
- Suthari, S., Sreeramulu, N., Omkar, K., Raju, V. S., 2014. The Climbing plants of Northern Telangana in India and their ethnomedicinal and economic uses. *Indian J. Plant Sci.*, 3(1): 86-100.
- Uma, R., Parthipan, B., 2015. Survey on medicobotanical climbers in Pazhayarur river bank of Kanyakumari District, Tamilnadu. *J. Med. Plants Stud.*, 3(1): 33-36.
- Yoganarasimhan, S. N., 2000. Medicinal plants of Tamil Nadu. Interline Publishing Private Ltd., Bangalore India.

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